

A NEW SEMI-TERRESTRIAL ACOTYLEAN FLATWORM, *MYORAMYXA PARDALOTA*
GEN. ET SP. NOV. (PLEHNIIDAE POLYCLADIDA) FROM SOUTHEAST
QUEENSLAND, AUSTRALIA

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A new acotylean flatworm, *Myoramyxa pardalota* gen. et sp. nov., is described from the high intertidal zone, southeast Queensland, Australia. The family Plehnidae Bock, 1913 is emended to contain this new monotypic genus which is characterised by possessing eyes around the anterior margin and retractile nuchal tentacles with eyes, but no frontal eyes, no seminal vesicle, and ejaculatory ducts that enter at the side of the large prostate; Lang's vesicle is lacking. The False Water-rat, *Xeromys myoides*, was observed to prey on these worms: this is the first record of a mammal feeding on a polyclad flatworm. □ Polycladida, Acotylea, Plehnidae, flatworm, taxonomy.

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Polyclad flatworms are, with one freshwater exception (*Limnostylochus* from Borneo), marine animals (Prudhoe, 1985) where they are well known as predators of invertebrates such as small crustaceans, molluscs and ascidians (Prudhoe, 1985; Cannon, 1986; Newman & Cannon, 1994). Some are even well-known pests of commercial bivalves including rock oysters (Stead, 1907; Jennings & Newman, 1996), pearl oysters and giant clams (Newman et al., 1993) and may pose a threat to these industries. None are known to invade terrestrial habitats.

Though active predators themselves, only three studies report predators of polyclads; these include a polychaete (Riser, 1974), and pufferfish (Poulter, 1975; Jennings & Newman, 1996). That polyclads are unlikely to be attacked or eaten is attributed to their being distasteful according to Prudhoe (1985), presumably because of their toxicity. Studies have shown that some acotylean species contain highly toxic substances such as tetrodotoxin (Jeon et al., 1986; Miyazawa et al., 1987). This may also explain why pufferfish can consume these worms (Flowers, pers. comm.).

This account is of a new monotypic genus of polyclads found in the semi-terrestrial supralittoral zone of Moreton Bay where it is exposed to predation by a mammal, the False Water-rat, *Xeromys myoides*.

Intertidal zone from: Myora, North Stradbroke Island (27°27'40"S; 153°25'40"E); Caloundra (26°48'S; 153°08'E) and Pebble Beach, near Bribie Island (27°05'S; 153°08'E), southeast Queensland. Animals were photographed in the laboratory, fixed on frozen polyclad fixative and preserved in 70% ethanol for histological preparations (Newman & Cannon, 1995). Whole mounts were stained with Mayer's Haemalum, dehydrated in graded alcohols and then mounted in Canada balsam. Longitudinal serial sections of the reproductive region were obtained from specimens embedded in Paraplast (56°C), sectioned at 5-7 µm, and then stained with haematoxylin and eosin.

Measurements of the body were taken from live animals in a relaxed state and are given as length mm x width mm. Measurements of the reproductive organs are taken from the paratypes. Reconstruction of the reproductive system is diagrammatic and derived from the sections with minimal interpretation. Drawings were made with the aid of a camera lucida by L.J.N. Specimens were collected and photographed by Bruce Cowell. This material is lodged at the Queensland Museum (QM) as whole mounts (WM), serial sections (LS) and wet specimens (S).

PLEHNIIDAE Bock, 1913

Myoramyxa gen. nov.

METHODS

Worms were hand collected from under fallen logs, driftwood and large rocks from the high

DIAGNOSIS. Plehnidae with marginal eyes in 3 to 4 rows anteriorly, becoming less numerous

about 1/3 of the way posteriorly along the margin. Frontal eyes absent. Possessing nuchal tentacles.

ETYMOLOGY. Named *Myora* for its type location and *myxa* = slime (L. fem.) for its ability to produce copious amounts of mucus.

TAXONOMIC REMARKS. As presently diagnosed (δ reproductive system without prostates, ejaculatory duct enters the side of the prostate, no seminal vesicle; γ system with ductus vaginalis with large ruffled antrum) Plehniidae contains worms lacking nuchal tentacles (Prudhoe, 1985; Cannon, 1986). The rather unusual and distinctive insertion of the ejaculatory duct into the side of the prostate distinguishes the Plehniidae from all other polyclads. *Myoramyxa* clearly has this character. We believe it is appropriate to emend the family diagnosis to include worms with or without nuchal tentacles. It should be noted that nuchal tentacles may not always be seen in poorly fixed material and may have been overlooked previously.

Within the Plehniidae this genus is similar to *Discocelides* Bergendal, 1893, however, *Myoramyxa* lacks a Lang's vesicle.

***Myoramyxa pardalota* sp. nov.**
(Figs 1, 2A-C)

MATERIAL EXAMINED. HOLOTYPE. *Myora*. Stradbroke Is., southeast Qld, under logs and rocks, high intertidal, 04.05.92, S. Van Dyke WM, QMG210875. PARATYPES. Same data, S, QMG210878; 12.05.92, LS, QMG210874; 19.07.92, LS, QMG210876; S, QMG210808; WM, QMG210877; Pumistone Passage, Caloundra, SE Qld, under log, high intertidal, 07.10.93, P. Davie, LS, QMG210873; Pebble Beach, Brihbe Is., SE Qld, 05.11.92, L. Newman & Z. Khalil, LS, QMG210872.

DESCRIPTION. Dorsal surface light brown with dark brown leopard spots (composed of microdots) closely packed in a dense pattern, darker brown medially forming a narrow, longitudinal line (Fig. 1). Ventral surface light orange-brown, darker medially with some dark brown pigment surrounding the mouth and gonopores.

Body round oval, thick and fleshy. Nuchal tentacles short, conical, retractile and relatively small, with about 40-50 eyes inside each tentacle, eyes absent at the base (Fig. 2A,B). Marginal eyes in 3 (to 4 rows anteriorly, becoming less numerous (to 2 rows) about 1/3 of the way along the margin. About 150-200 cerebral eyes between the tentacles, no frontal eyes. Pharynx oval, central, mouth posterior, extending approx. 1/3 the length of the body. Gonopores posterior to the pharynx. δ pore



FIG. 1. Live *Myoramyxa pardalota*, gen. et sp. nov., holotype (QMG210875): dorsal (top) and posterior ventral views. (Photo by B. Cowell)

small, anterior and close to the γ pore; ductus vaginalis well separated from gonopores, large ruffled antrum. Size range 30mm x 25mm (mature) to 35mm x 25mm (mature).

Large prostate (1.8 mm), seminal vesical lacking, spermaducal bulbs joining ejaculatory duct which enters laterally into the prostate. Penis papillae wide, without stylet. δ antrum narrow and deep. γ antrum deep and ruffled. Vagina leads dorsoanteriorly, then is highly coiled posteriorly until it leads into a voluminous, muscular, swollen ductus vaginalis.

DIAGNOSIS. With characters of the genus and a dorsal surface with dark pattern of brown spots like a leopard with a narrow, dark median line.

ETYMOLOGY. Named *pardalota* = spotted like a leopard (L. fem.) for its spotted dorsal colour pattern.

HABITAT & DISTRIBUTION. Common inside or under hardwood logs, driftwood or rocks in the high intertidal (supralittoral) zone particularly with adjacent mangroves from Moreton Bay, SE Queensland.

DISCUSSION. The Plehniidae are somewhat aberrant members of the Stylochoidea (*sensu* Prudhoe, 1985) in that they frequently have few or no eyes anteriorly. The distinctive manner in which the ejaculatory duct joins at the side of the

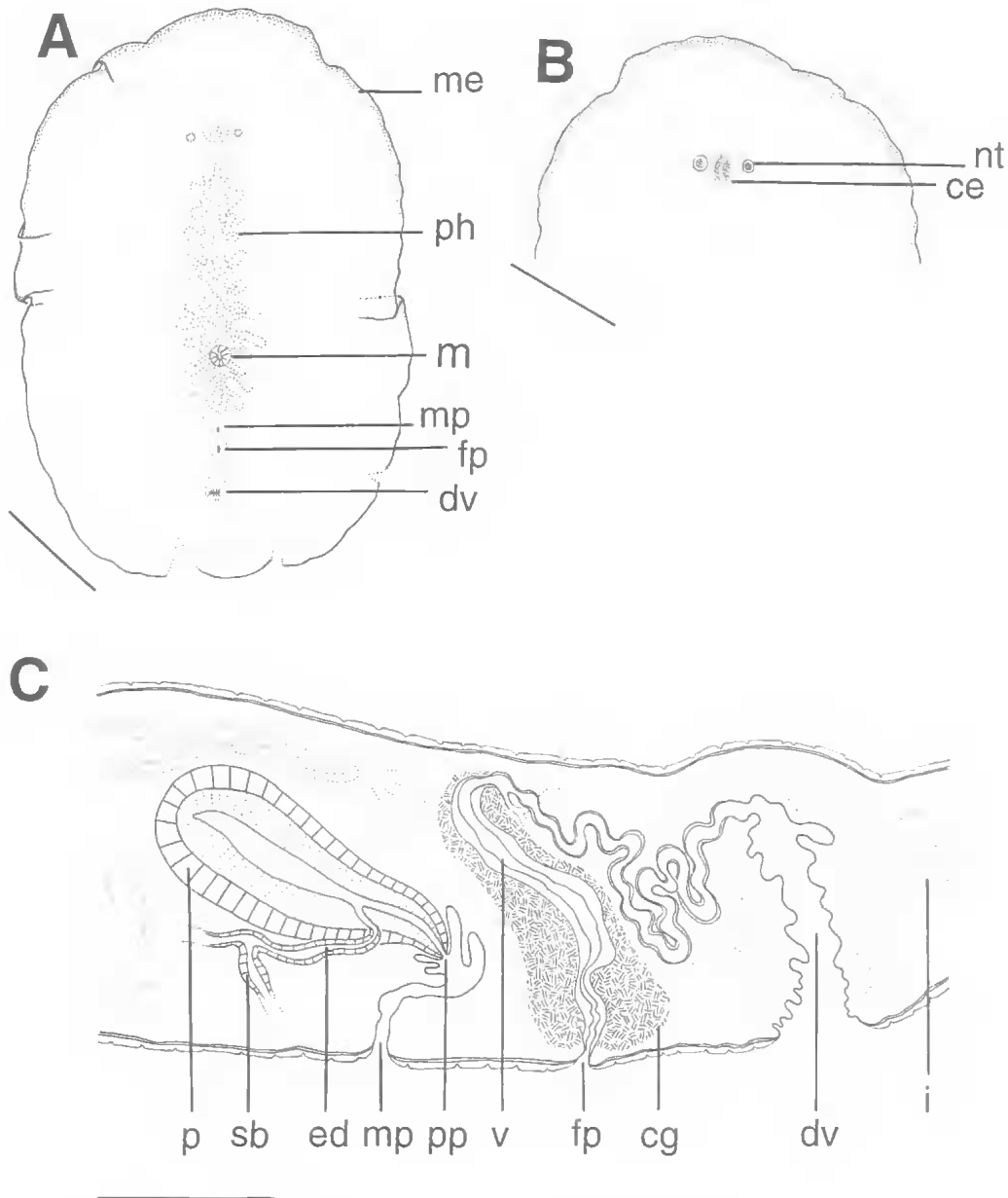


FIG. 2. *Myoramyxa pardalota*, gen. et sp. nov.: A, holotype (QMG210875), wholemount of the ventral side and B, eye arrangement from the dorsal side; C, paratype (QMG210876), diagrammatic representation of the reproductive anatomy. Scales: A,B, 5mm; C, 1mm. (Legend: ce = cerebral eyes, cg = cement glands, dv = ductus vaginalis, ed = ejaculatory duct, fp = ♀ pore, i = intestine, m = mouth, me = marginal eyes, mp = ♂ pore, nt = nuchal tentacles, p = prostate, ph = pharynx, pp = penis papilla, sb = spermaductal bulb, v = vagina).

prostate, however, would seem to be a synapomorphy for the group. Characters such as the presence of nuchal tentacles, which could so easily be overlooked, we believe should not be over-

emphasised. Consequently, we consider the emendation of the family Plehniidae to be justified and a more conservative approach than erection of a new family at this time.

These worms were brought to our attention by Steve Van Dyck who had found them being eaten, with apparent relish, by the False Water-rat, *Xeromys myoides* (see figure p. 36-7) (Van Dyck, 1994). The rat forages at night in the supralittoral and littoral at the upper influence of the tide. During the day worms are found in sheltered locations quite out of water such as the moist inside or underside of hardwood logs thrown up as driftwood in the supralittoral zone; as many as 14 worms have been found clustering together.

In the laboratory worms actively retreat from water, if placed in it and given the opportunity to crawl out. They produce copious amounts of clear mucus which surrounds the resting animal like a jelly coat. In the field their presence is revealed by slime trails similar to those produced by slugs and snails. Presumably these animals emerge at night to forage on small invertebrates. They are clearly semi-terrestrial which has evidently exposed them to predation.

Many polyclads are known to be highly toxic: it remains to be seen if *Myoramyxa* is toxic particularly since the rat evidently finds them delectable.

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LITERATURE CITED

- CANNON, L.R.G. 1986. Turbellaria of the World- A Guide to Families and Genera. Queensland Museum, Brisbane. 136 pp.
- JENNINGS, K.A. & NEWMAN, L.J. 1996 Four new stylochid flatworms associated with oysters from southeast Queensland, Australia. *Raffles Bulletin of Zoology*. 44:493-508
- JEON, K. J., MIYAZAWA, K., NOGUCHI, T., NARITA, H., MATSUBARA, S., NARA, M., ITO K., & HASHIMOTO, K. 1986. Occurrence of Paralytic Toxicity in Marine Flatworms. *Bulletin of the Japanese Society of Scientific Fisheries* 52(6): 1065-1069.
- MIYAZAWA, K., JEON, J. K., NOGUCHI, T., ITO, K. & HASHIMOTO, K. 1987. Distribution of Tetrodotoxin in the Tissues of the Flatworm *Planocera multitentaculata* (Platyhelminthes). *Toxicon* 25(9): 975-980.
- NEWMAN, L.J. & CANNON, L.R.G. 1994. *Pseudoceros* and *Pseudobiceros* (Polycladida, Pseudocerotidae) from Eastern Australia and Papua New Guinea. *Memoirs of the Queensland Museum* 37(1): 205-266.
1995. The importance of the fixation of colour, pattern and form in tropical Pseudocerotidae (Platyhelminthes, Polycladida). *Hydrobiologia* 305: 141-143.
- NEWMAN, L.J., CANNON, L.R.G. & GOVAN, H. 1993. *Stylochus (Imogene) matatasi* n. sp. (Platyhelminthes, Polycladida): Pest of cultured giant clams and pearl oysters from Solomon Islands. *Hydrobiologia* 257: 185-189
- POULTER, J.L. 1975. Hawaiian polyclad flatworms: prosthiostomids. *Pacific Science* 29: 317-339.
- PRUDHOE, S. 1985. A Monograph on Polyclad Turbellaria. (Oxford University Press: Oxford).
- RISER, N.W. 1974 Epilogue. Pp. 517-524. In Riser, N.W. & Morse, M.P. (eds) 'Biology of the Turbellaria' (McGraw-Hill: New York).
- STEAD, D.G. 1907. Preliminary note on the wafer (*Leptoplana australis*), a species of dendrocoelous turbellarian worm, destructive to oysters. 6 p. (Department of Fisheries, NSW: Sydney).
- VAN DYCK, S. 1994 The rats at Neptune's table. *Australian Natural History* 24(8): 30-37.